UTMB-Galveston
SURGICAL INTENSIVE CARE UNIT
ORGAN PROCUREMENT PROTOCOL

For questions call:
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Hemodynamically stable?	Yes _____	No _____
Is T3 or T4 started?	Yes _____	No _____
Is Vasopressin started?	Yes _____	No _____
Is fluid replacement adequate?	Yes _____	No _____
Acidemic or Alkalemic?	Yes _____	No _____
Immunosuppressed?	Yes _____	No _____
Is methylprednisolone started?	Yes _____	No _____
Normoglycemic?	Yes _____	No _____
Is insulin started?	Yes _____	No _____
Normothermic?	Yes _____	No _____
Nutrition started?	Yes _____	No _____
Electrolyte derangements?	Yes _____	No _____
Aseptic?	Yes _____	No _____

If there are any “No” responses above, please see below.

Cardiovascular:

Myocardial stunning/Acute heart failure/Hypotension
Hypertension

Place central venous line and arterial line, if not already done.

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Replace intravascular volume as appropriate (SEE FLUIDS/ELECTROLYTES/NUTRITION AND HEMATOLOGY SECTIONS)

↓

Start vasopressin 1 unit/hr (0.017 units/min), titrate to maximum of 2.4 units/hr (0.04 units/min) to MAP 60-80 mmHg, and wean norepinephrine/epinephrine to lowest dose or discontinue if previously started

↓

Maximum dose of vasopressin and MAP < 60 mmHg?

Yes ↓

- Start dopamine 2 mcg/kg/min and titrate to maximum of 10 mcg/kg/min
- Obtain echocardiogram after single vasopressor started (excluding T3 or T4 & vasopressin) and volume deficit corrected if needed to evaluate for structural abnormalities and left ventricular function

↓

Refractory MAP <60 mmHg while on vasopressin and dopamine?

Yes ↓

Start phenylephrine 0.3 mcg/kg/min and titrate to maximum of 2 mcg/kg/min

- If hypotension in extremis, may change phenylephrine to norepinephrine and/or epinephrine infusions, but wean to lowest dose possible
- Consider dobutamine and/or milrinone if refractory hypotension, if suspecting decreased cardiac output/cardiac failure (cardiac index ≤2.4 liters/min/m^2 in spite of correction of volume deficit and if pulmonary artery catheter readings are available NOTE: do not place a pulmonary artery catheter if not placed prior to brain death), ejection fraction < 45%, or if norepinephrine has been initiated
  - For dobutamine, start 2.5 mcg/kg/min and titrate to maximum of < 10 mcg/kg/min
  - For milrinone, start 0.375 mcg/kg/min
  - Target cardiac index ≥ 2.4 liters/min/m^2

↓

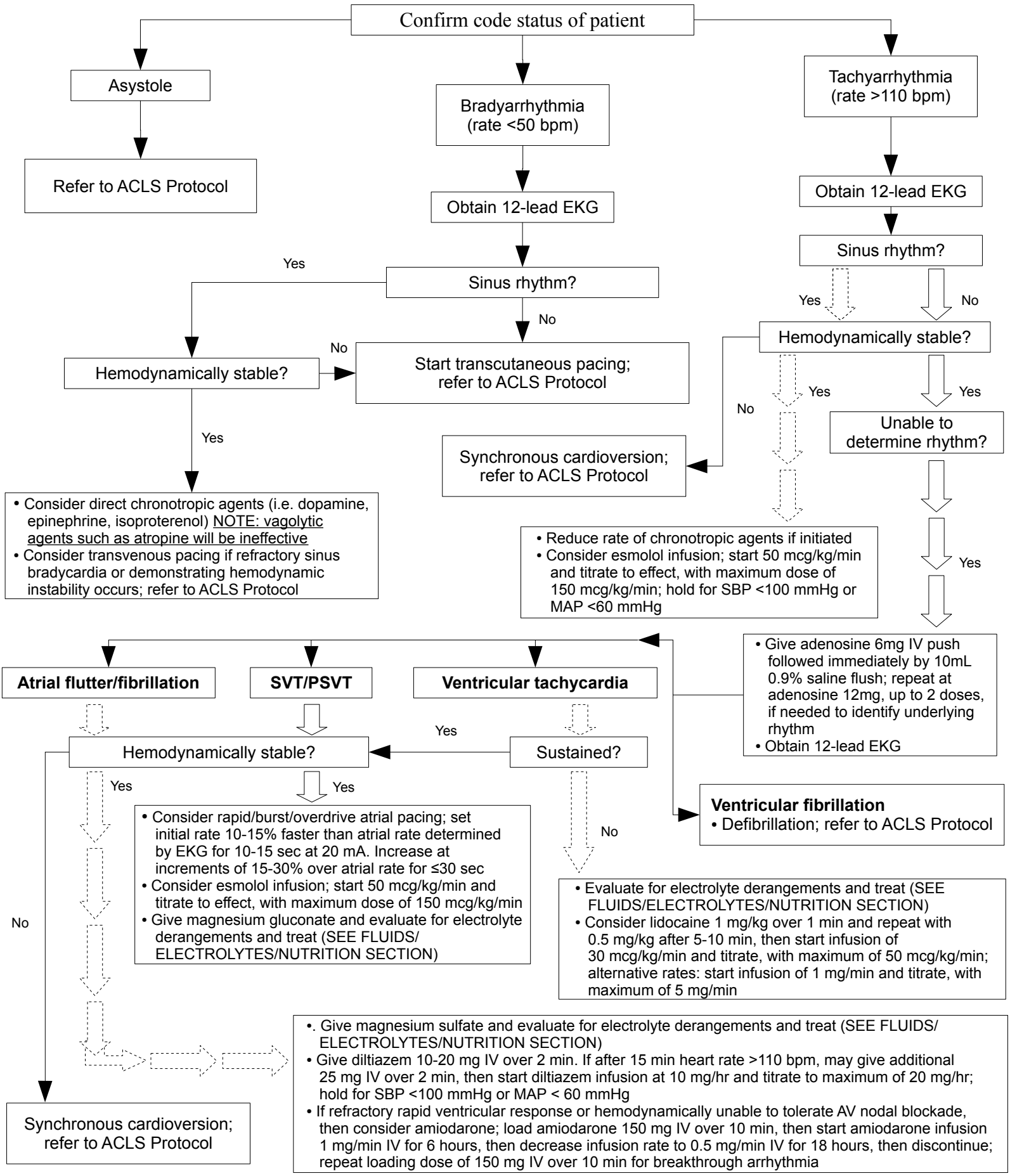
SBP>160 mmHg, DBP >110 mmHg, or MAP >90 mmHg?

Yes ↓

- Decrease vasopressor infusion(s)
- If refractory hypertension consider short acting antihypertensive agents (i.e. esmolol, nitroprusside)
  - For esmolol, start 25 mcg/kg/min and titrate to effect
  - For nitroprusside, start 0.1 mcg/kg/min and titrate to maximum of 10 mcg/kg/min NOTE: prepare nitroprusside 50 mg in 250 mL D5W

Cardiovascular:

Arrhythmia



Pulmonary:

Neurogenic pulmonary edema
Atelectasis/Derecruitment/SALT Protocol†

Ventilator settings
- PRVC/AC
- Tidal volume 6-8 mL/kg of ideal body weight
- PEEP 5-10 cm H_20
- FiO_2 1.0, but titrate to lowest FiO_2 to maintain PaO_2 >100, SaO_2 >95%
- Start respiratory rate at 12-14 breaths/min, and adjust to maintain $PaCO_2$ 35-45 mmHg, pH 7.35-7.45
- Peak inspiratory pressures <35 cm H_20; plateau inspiratory pressures <30 cm H_20

- Elevate head of bed to 30°
- Inflate endotracheal pilot balloon to 25 cm H_20
- Give albuterol 2.5 mg in 3 mL nebulized q2 hours
- Suction and oral care q1 hour

Peak inspiratory pressures >35 cm H_20 and/or plateau inspiratory pressures >30 cm H_20?

- Suction
- Give albuterol nebulizer treatment

Improved?

No

Pulmonary edema is suspected?

Yes

Give furosemide 0.5 mg/kg IV push

Improved?

No

Give albumin 25% 100 mL IVPB and Furosemide 0.25-0.5 mg/kg IV push (if MAP > 60 mmHg)

No

Improved?

Yes

PaO_2/FiO_2 <300?

Yes

PaO_2/FiO_2 <100 or oxygen saturation <90%?

Yes

No

- Set ventilator to Pressure AC, PS 25 cm H_20, and PEEP 15 cm H_20 for 2 hours
- Then return to PRVC/AC, set tidal volume to 10 ml/kg of ideal body weight, and PEEP 5 cm H_20
- Obtain CXR 30 min after being placed on ventilator settings as described above

PaO_2/FiO_2 <300 and chest X-ray shows improvement?

No

PaO_2/FiO_2 <100 or oxygen saturation <90%?

No

Yes

- Consider Airway Pressure Release Ventilation (APRV) with the following settings:
  - $Pressure_{High}$ 30 cm H_20
  - $Pressure_{Low}$ 0 cm H_20
  - $Time_{High}$ 4 seconds
  - $Time_{Low}$ 0.8 seconds
  - FiO_2 1.0, but titrate to lowest
  - FiO_2 to maintain PaO_2 >100, SaO_2 >95%
- Consider bronchoscopy with bilateral bronchoalveolar lavage to evaluate areas of pulmonary infiltrates, contusion, or aspiration on chest X-ray

† San Antonio Lung Transplant Protocol

Endocrine:

Hypothyroidism/Sick euthyroid syndrome
Panhypopituitarism/Adrenal insufficiency
Hypoglycemia/hyperglycemia
Hypothermia/hyperthermia

Infectious disease/Immunology:

Immunosuppression therapy
Prophylactic antibiotic therapy

- Start triiodothyronine or liothyronine (T3) 4 mcg IV bolus, then continuous infusion at 3 mcg/hr

OR

- Start levothyroxine (T4) 20 mcg IV bolus push, then continuous infusion at 25 mcg/hr, titrate to keep MAP ≥ 60 mmHg NOTE: prepare levothyroxine 400 mcg in 250-500 mL 0.9% saline (preferred by Southwest Transplant Alliance)

- Give methylprednisolone 2000 mg IV push, one time dose for the first 24 hours
- Continue methylprednisolone 15 mg/kg IV q24hours

- Give D_{50} 25 g (50 mL) IV push
- Give Insulin Regular 20 units IV push
- Maintain euglycemia, goal BS 110-180 mg/dL
  - If BS < 70 mg/dL, then give D_{50} 25 g (50 mL) IV push
  - If BS >180 mg/dL, cover with insulin sliding scale
  - If BS >180 mg/dL despite sliding scale coverage, place on insulin infusion

  NOTE: be sure a dextrose infusion is started with the insulin infusion

- Maintain core body temperature 36-37.5ºC with warming/cooling blanket, fluids warmer/cooler

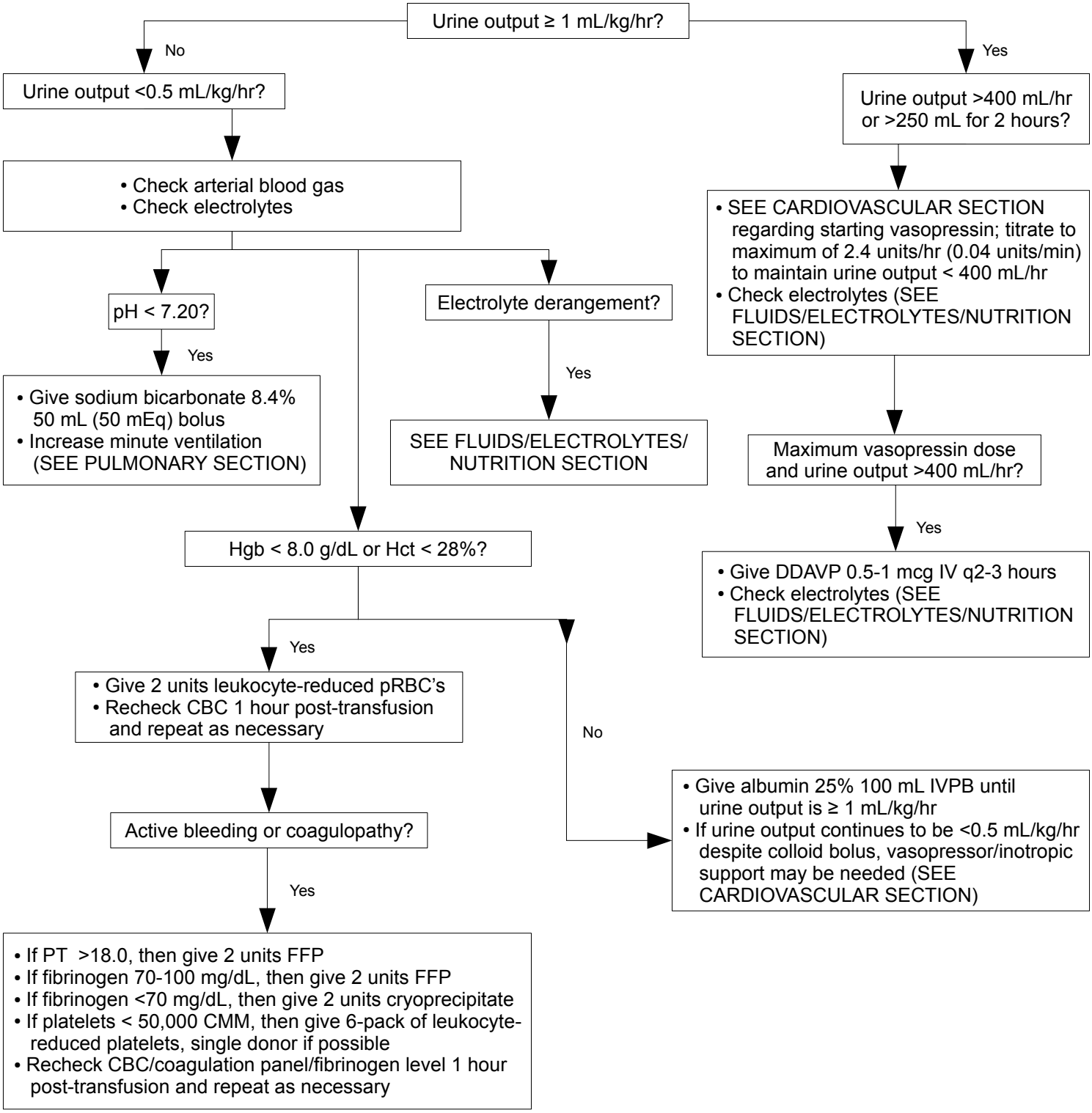
- Consider broad spectrum antibiotic therapy as indicated
- If culture results positive, then use culture-directed antibiotic therapy

Hematology:

Anemia (target range Hgb ~10 g/dL, Hct > 30%)
Coagulopathy

Renal:

Central diabetes insipidus
Acute kidney injury/Acute tubular necrosis/Oliguria
Metabolic acidosis, unspecified



Fluids/Electrolytes/Nutrition:

Electrolyte derangement (target serum osmolality 285-295 mOsm/kg)

Hyponatremia/hypernatremia (target range 134-145 mEq/L)

Sodium <130 mEq/L	Sodium > 145 mEq/L
• Free water restrict	• Calculate free water deficit with the following formula: (0.6 x wt in kg) x ((Current Na/140) – 1) = free water deficit in L • Infuse half of deficit with 0.25% saline over 2 hours, more rapidly if hypotensive (MAP < 60 mmHg) • Recheck Na and repeat above calculation with new results • Consider free water replacement via feeding tube if already in place and gastrointestinal tract is intact using the above formula given in divided doses over 24 hours

Hypokalemia/hyperkalemia (target range 3.5-5.0 mEq/L)

Potassium <3.5 mEq/L	Potassium >5.0 mEq/L
• Give potassium chloride 20-40 mEq in 100 mL 0.9% saline IVPB (may consider enteric administration) • Add potassium chloride 40 mEq to IV fluids, if not done already • (If phosphorus is also low, may substitute with potassium phosphate 20-40 mEq in 100 mL 0.9% saline IVPB per SICU protocol—SEE BELOW)	• Hold all potassium sources • Recheck level in 1 hour • If level is not trending down, then give insulin regular 20 units IV push and D_{50} 25 g (50 mL) IV push • Consider calcium chloride or calcium gluconate (for dosing SEE BELOW) • Consider insulin infusion NOTE: be sure a dextrose infusion is started with the insulin infusion

Hypomagnesemia/hypermagnesemia (target range 1.8-2.4 mg/dL)

Magnesium <1.8 mg/dL	Magnesium >2.4 mg/dL
• Give magnesium sulfate 2 g in 100 mL 0.9% saline IVPB	• Hold all magnesium sources • Recheck level in 1 hour

Hypophosphatemia/hyperphosphatemia (target range 2.5-5.0 mg/dL)

Phosphorus < 2.0 mg/dL	Phosphorus >5.0 mg/dL
• Give potassium phosphate 20-40 mEq in 100 mL 0.9% saline IV	• Hold all phosphorus sources • Recheck level in 1 hour

Hypocalcemia/hypercalcemia (target range 4.5-5.3 mg/dL)

Ionized calcium <4.5 mg/dL	Ionized calcium >5.3 mg/dL
• Give 10% calcium chloride 10 mL (1 g) IV push (central line only) • Consider calcium gluconate 1-2 g in 50 mL 0.9% saline IVPB as alternative if only peripheral access available	• Hold all calcium sources • Recheck level in 1 hour

Nutrition

- Continue enteric feeds if already started
- If not already on enteric feeds, then place Dobhoff feeding tube, if not already placed, if not contraindicated
- Start Jevity enteral feeds at 50 mL/hr, if gastrointestinal tract is intact, and target 25 kcal/kg/day
- Check residuals q2 hours
- Hold enteric feeds if residuals greater than 250 mL
- Consider addition of prokinetic agents (i.e. metoclopramide) if residuals remain greater than 250 mL
- Consider Nutrition consultation